

## TABLE OF CONTENTS

<b>APPENDIX 1C AIR QUALITY METHODOLOGY AND ASSUMPTIONS.....</b>	<b>1C-1</b>
1C.1 Alternative 1: No Action .....	1C-1
1C.2 Alternative 2: 3.5-Foot Dam Raise/478 Flood Pool Elevation.....	1C-1
1C.2.1 Fill Dirt: Barge Emissions .....	1C-1
1C.2.2 Fugitive Dust.....	1C-2
1C.2.3 Employee Commute Trips .....	1C-2
1C.2.4 Off-Road Construction Equipment.....	1C-2
1C.3 Alternative 3: Seven-Foot Dam Raise/482-Foot Flood Pool Elevation .....	1C-2
1C.3.1 Fill Dirt: Haul Truck Emissions.....	1C-2
1C.3.2 Fill Dirt: Barge Emissions .....	1C-3
1C.3.3 Fugitive Dust.....	1C-4
1C.3.4 Employee Commute Trips .....	1C-4
1C.3.5 Off-Road Construction Equipment.....	1C-4
1C.4 Alternative 4: Twelve-Foot Dam Raise/487-Foot Flood Pool Elevation.....	1C-4
1C.4.1 Fill Dirt: Haul Truck Emissions.....	1C-4
1C.4.2 Fill Dirt: Barge Emissions .....	1C-5
1C.4.3 Fugitive Dust.....	1C-5
1C.4.4 Employee Commute Trips .....	1C-5
1C.4.5 Off-Road Construction Equipment.....	1C-6
1C.5 Alternative 5: Stepped Release to 160,000 cfs.....	1C-6
1C.5.1 Fill Dirt: Haul Truck Emissions.....	1C-6
1C.5.2 Fugitive Dust.....	1C-10
1C.5.3 Employee Commute Trips .....	1C-10
1C.5.4 Off-Road Construction Equipment.....	1C-10
1C.6 Alternative 6: Stepped Release to 160,000 cfs and New Outlet at Folsom Dam ....	1C-10
1C.6.1 Fill Dirt: Haul Truck Emissions.....	1C-10
1C.6.2 Fugitive Dust.....	1C-10
1C.6.3 Employee Commute Trips .....	1C-10
1C.6.4 Off-Road Construction Equipment.....	1C-10
1C.7 Alternative 7: Stepped Release to 180,000 cfs .....	1C-10
1C.7.1 Fill Dirt: Haul Truck Emissions.....	1C-10
1C.7.2 Fugitive Dust.....	1C-14
1C.7.3 Employee Commute Trips .....	1C-14
1C.7.4 Off-Road Construction Equipment.....	1C-14
1C.8 Alternative 8: Stepped Release to 160,000 cfs and Seven-Foot Dam Raise/ 482-Foot Flood Pool Elevation .....	1C-14
1C.9 Reference.....	1C-14



## APPENDIX 1C

### AIR QUALITY METHODOLOGY AND ASSUMPTIONS

#### 1C.1 Alternative 1: No Action

No assumptions.

#### 1C.2 Alternative 2: 3.5-Foot Dam Raise/478-Foot Flood Pool Elevation

It was assumed that no fill would come from the Mississippi Bar borrow site and that 10,000 cubic yards would come from the Peninsula Camp Ground borrow site. Barge assumptions are listed below. Additionally, it was assumed that there would be 0.5 acre of area disturbed for this project alternative. This was calculated by dividing the total amount of fill needed by a 3-foot-high raise. For the modifications for Alternative 2, it was assumed that there would be nine major modification areas, with each modification area on and around Folsom Reservoir using differing amounts of fill:

Mod 1	10.2	% Dirt for Alternative
Mod 2	5.8	% Dirt for Alternative
Mod 3	3.0	% Dirt for Alternative
Mod 4	7.6	% Dirt for Alternative
Mod 5	35.2	% Dirt for Alternative
Mod 6	9.5	% Dirt for Alternative
Mod 7	2.6	% Dirt for Alternative
Mod 8	1.4	% Dirt for Alternative
Mod 9	24.7	% Dirt for Alternative

It was also assumed that construction would occur in phases around the dam for a 4-year duration, with construction starting at one end, and working around the dam to the final modification area. Additionally, it was assumed that construction would occur for approximately 6 months per year, as construction would not occur during flood season. Total days of construction for each modification area was determined by determining the percentage of total dirt each modification area needed, and multiplying this amount by 500 days (125 days of construction per year for 4 years).

##### 1C.2.1 Fill Dirt: Barge Emissions

No data were provided for haul volume capacity for the barges, so it was assumed that a barge would carry 7,500 cubic yards of fill per trip, and there would be one trip per day. Barge

emissions were estimated by multiplying barge emission factors by one barge a day for a 10-hour workday. It was assumed that mitigation would reduce emissions by approximately 20%.

### **1C.2.2 Fugitive Dust**

It was assumed that the maximum acreage disturbed per day is 25% of the total acreage disturbed. It was also assumed that an emission factor of 10 pounds of PM10 per day per acre was appropriate. Multiplying the maximum acreage disturbed per day by the fugitive dust emission factor resulted in the amount of fugitive dust generated per day. It was also assumed that mitigation will reduce this amount by 50%.

### **1C.2.3 Employee Commute Trips**

Employee commute trips were estimated by multiplying the total number of off road equipment used by 1.2. It was assumed that each employee would have two trips per day, so total number of trips was multiplied by vehicle emissions, which were taken from Urbemis7G. It was assumed that mitigation would reduce emissions by approximately 20%.

### **1C.2.4 Off-Road Construction Equipment**

Equipment used for off-road construction equipment was estimated from Volume 2-Appendix E of the March 1996 American River Watershed Project Supplemental Information Report. Each equipment was multiplied by its corresponding emission factor for a 10-hour workday to estimate total emissions. It was assumed that mitigation would reduce emissions by approximately 20%.

## **1C.3 Alternative 3: Seven-Foot Dam Raise/482-Foot Flood Pool Elevation**

### **1C.3.1 Fill Dirt: Haul Truck Emissions**

It was assumed that 675,000 cubic yards of fill needed would come from the Mississippi Bar borrow site and that 75,000 cubic yards would come from the Peninsula Camp Ground borrow site. Fill from the Mississippi Bar borrow site would be barged a distance of 1 mile across Lake Natoma, where it will be then be trucked to the individual modification areas. Barge assumptions are listed below. Additionally, it was assumed that there would be 5.1 acres of area disturbed for this project alternative. This was calculated by dividing the total amount of fill needed by a 10-foot-high raise. For the modifications for Alternative 3, it was assumed that there would be nine major modification areas, with each modification area on and around Folsom Reservoir using differing amounts of fill:

Mod 1	10.2	% Dirt for Alternative
Mod 2	5.8	% Dirt for Alternative
Mod 3	3.0	% Dirt for Alternative
Mod 4	7.6	% Dirt for Alternative
Mod 5	35.2	% Dirt for Alternative
Mod 6	9.5	% Dirt for Alternative
Mod 7	2.6	% Dirt for Alternative
Mod 8	1.4	% Dirt for Alternative
Mod 9	24.7	% Dirt for Alternative

It was assumed that construction would occur over a period of 190 days per year, with construction at each modification area occurring sequentially. It was estimated that the average haul trip length from Mississippi Bar to a modification area would be approximately 8.7 miles. With an estimate of a haul truck average traveling speed of 35 miles per hour and approximately 1 hour to load and unload, it was estimated that there would be approximately six total haul trips a day in a 10-hour construction day. Emission factors for haul trucks were obtained from EMFAC7G modeling outputs, and these were used to determine haul truck emissions. Assuming 190 days of construction per year and six 20-cubic yard capacity haul trucks operating at each modification area, a minimum construction period of 4.1 years would be required for the movement of fill material required. Assuming 300 days of construction per year and six 20-cubic yard capacity haul trucks operating at each modification area, a minimum construction period of 2.6 years would be required for the movement of fill material required.

For mitigation, 50% of the vehicle fleet was assumed to be 1996 or newer vehicles for a 10% reduction in NO<sub>x</sub> emissions, and the use of low NO<sub>x</sub> fuels is assumed to reduce NO<sub>x</sub> emissions by 14% and PM<sub>10</sub> emissions by 63%. In addition, standard PM<sub>10</sub> mitigation measures was assumed to reduce PM<sub>10</sub> levels by 50%.

### 1C.3.2 Fill Dirt: Barge Emissions

No data were provided for haul volume capacity for the barges, so it was assumed that over a 190 day construction period, there would be 380 barge trips, and over a 300 day construction period, there would be 600 barge trips. Barge emissions were estimated by multiplying barge emission factors by two barges a day for both four and six hours per day in a 10-hour workday. Barge emission factors were obtained from the EPA document, *Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data*. (U.S. Environmental Protection Agency 2000), with the assumption of a barge with a power rating of 2000 horsepower. For mitigation, the use of low NO<sub>x</sub> fuels is assumed to reduce NO<sub>x</sub> emissions by 14% and PM<sub>10</sub> emissions by 63%.

### **1C.3.3 Fugitive Dust**

It was assumed that the maximum acreage disturbed per day is 25% of the total acreage disturbed. It was also assumed that an emission factor of 10 pounds of PM10 per day per acre was appropriate. Multiplying the maximum acreage disturbed per day by the fugitive dust emission factor resulted in the amount of fugitive dust generated per day. For mitigation, the use of low NO<sub>x</sub> fuels is assumed to reduce PM10 emissions by 63%. In addition, standard PM10 mitigation measures was assumed to reduce PM10 levels by 50%.

### **1C.3.4 Employee Commute Trips**

Employee commute trips were estimated by multiplying the total number of off road equipment used by 1.2. It was assumed that each employee would have two trips per day, so the total number of trips was multiplied by vehicle emissions, which were taken from Urbemis7G.

### **1C.3.5 Off-Road Construction Equipment**

Equipment used for off-road construction equipment was estimated from Volume 2-Appendix E of the March 1996 American River Watershed Project Supplemental Information Report and previous Jones & Stokes' experience with similar settings. Each equipment was multiplied by its corresponding emission factor for a 10-hour workday to estimate total emissions. For mitigation, 50% of the vehicle fleet was assumed to be 1996 or newer vehicles for a 10% reduction in NO<sub>x</sub> emissions, and the use of low NO<sub>x</sub> fuels is assumed to reduce NO<sub>x</sub> emissions by 14% and PM10 emissions by 63%. In addition, standard PM10 mitigation measures was assumed to reduce PM10 levels by 50%.

## **1C.4 Alternative 4: Twelve-Foot Dam Raise/487-Foot Flood Pool Elevation**

### **1C.4.1 Fill Dirt: Haul Truck Emissions**

It was assumed that 1,350,000 cubic yards of fill needed would come from the Mississippi Bar borrow site and that 150,000 cubic yards would come from the Peninsula Camp Ground borrow Site. Fill from the Mississippi Bar borrow site would be barged a distance of one mile across Lake Natoma, where it will be then be trucked to the individual modification areas. Barge assumptions are listed below. Additionally, it was assumed that there would be 14.9 acres of area disturbed for this project alternative. This was calculated by dividing the total amount of fill needed by a 12-foot-high raise. For the modifications for Alternative 4, it was assumed that there would be nine major modification areas, with each modification area on and around Folsom Reservoir using differing amounts of fill:

Mod 1	10.2	% Dirt for Alternative
Mod 2	5.8	% Dirt for Alternative
Mod 3	3.0	% Dirt for Alternative
Mod 4	7.6	% Dirt for Alternative
Mod 5	35.2	% Dirt for Alternative
Mod 6	9.5	% Dirt for Alternative
Mod 7	2.6	% Dirt for Alternative
Mod 8	1.4	% Dirt for Alternative
Mod 9	24.7	% Dirt for Alternative

It was also assumed that construction would occur in phases around the dam for a 4-year duration, with construction starting at one end, and working around the dam to the final modification area. Additionally, it was assumed that construction would occur for approximately 6 months per year, as construction would not occur during flood season. Total days of construction for each modification area was determined by determining the percent of total dirt each modification area needed, and multiplying this amount by 500 days (125 days of construction per year for 4 years). It was estimated that the average haul trip length from Mississippi Bar to a modification area would be approximately 8.7 miles. With an estimate of a haul truck average traveling speed of 35 mph and approximately 1 hour to load and unload, it was estimated that there would be approximately six total haul trips a day in a 10-hour construction day. The number of haul trucks needed at each modification area was estimated by dividing the number of cubic yards needed at each modification area by 20 cubic yards (average haul capacity of a haul truck), dividing this amount by the estimated number of days construction for each modification area, and then dividing this amount by the number of estimated trips in a 10-hour workday. The total number of haul trucks was found to be 22.5 trucks per modification area. This number was rounded to 23 haul trucks per modification area. Emission factors for a haul truck were then multiplied by the number of trucks to estimate haul truck emissions. It was assumed that mitigation would reduce emissions by approximately 20%.

#### **1C.4.2 Fill Dirt: Barge Emissions**

Same as under Alternative 2.

#### **1C.4.3 Fugitive Dust**

Same as under Alternative 2.

#### **1C.4.4 Employee Commute Trips**

Same as under Alternative 2.

### **1C.4.5 Off-Road Construction Equipment**

Same as under Alternative 2.

## **1C.5 Alternative 5: Stepped Release to 160,000 cfs**

Alternative 5 was broken into two components, construction along the Lower American River and construction along the Yolo and Sacramento Bypass areas.

### **1C.5.1 Fill Dirt: Haul Truck Emissions**

It was determined that fill for the Lower American River would come from the West Sacramento borrow site. Additionally, it was determined that there would be 45.5 acres of area disturbed in the Lower American River area and 255.4 acres of area disturbed in the bypass areas for this project alternative. This was calculated by multiplying length of the proposed modifications by width of affected areas. For construction along the Lower American River, it was assumed that there would be four major modification areas, with each modification area grouped according to geography. It was also assumed that each modification area would use differing amounts of fill:

Mod 1	11.6	% Dirt for Alternative
Mod 2	9.9	% Dirt for Alternative
Mod 3	39.5	% Dirt for Alternative
Mod 4	39.0	% Dirt for Alternative

Total fill estimated for Alternative 5 is 1,152,088 cubic yards of fill. Fill for the Lower American River would come from the West Sacramento borrow site. There would be 45.5 acres of area disturbed in the Lower American River area and 255.4 acres of area disturbed in the bypass areas for this project alternative.

It was also assumed that construction would occur in phases along the Lower American River for a 4-year duration, with construction starting at one end, and working down/upstream to the opposite end to the final modification area. Total days of construction for each modification area was determined by determining the percent of total dirt each modification area needed, and multiplying this amount by 500 days (125 days of construction per year for 4 years). It was estimated that the average haul trip length from the West Sacramento borrow site to a modification area 1 would be approximately 22 miles, to modification area 2 would be approximately 18 miles, and to modification areas 3 and 4 would be approximately 13 miles. With an estimate of a haul truck average traveling speed of 35 mph and approximately 1 hour to load and unload, it was estimated that there would be approximately four total haul trips per day in a 10-hour construction day for modification area 1 and five total haul trips per day for modification areas 2, 3, and 4. The number of haul trucks needed at each modification area was estimated by dividing the number of cubic yards needed at each modification area by 20 cubic yards (average haul capacity of a haul truck), dividing this amount by the estimated number of



days construction for each modification area, and then dividing this amount by the number of estimated trips in a 10-hour workday. The total number of haul trucks was found to be 11 trucks for modification area 1 and eight trucks for modification areas 2, 3, and 4. Emission factors for a haul truck were then multiplied by the number of trucks to estimate haul truck emissions. It was assumed that mitigation would reduce emissions by approximately 20%.

It was determined that fill for the bypass areas would come from the Cache Creek, West Sacramento, Rio Vista, and Decker Island borrow sites. For construction along the bypass areas, it was assumed that there would be 19 major modification areas, based on data from the Corps. It was also assumed that each modification area would use differing percentages of fill from the borrow sites:

<b>Borrow Sites for Bypass areas</b>	<b>501-00-1</b>	<b>349-00-1</b>	<b>3-00-1</b>	<b>3-00-6</b>	<b>349-1</b>	<b>508-1</b>	<b>509-1</b>	<b>3-2</b>	<b>3-3</b>	<b>501-1A</b>	<b>2098-10</b>	<b>2098-10A</b>	<b>2068-1</b>	<b>2068-2</b>	<b>49.4</b>	<b>47.2</b>	<b>44.9</b>	<b>23.2</b>	<b>22.1</b>
Cache Creek	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.00	40.00	30.00	0.00	0.00
West Sac.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.00	60.00	70.00	0.00	0.00
Rio Vista	70.00	70.00	70.00	70.00	70.00	70.00	75.00	70.00	70.00	75.00	70.00	70.00	70.00	70.00	0.00	0.00	0.00	70.00	70.00
Decker Island	30.00	30.00	30.00	30.00	30.00	30.00	25.00	30.00	30.00	25.00	30.00	30.00	30.00	30.00	0.00	0.00	0.00	30.00	30.00

Percentages above for fill going to each modification area was estimated based on each modification area's distance from the closest borrow sites.

The amount of fill required for each modification area was from data provided by the Corps:

			<b>Days of Construction</b>	<b>Average Haul Distance (miles)</b>	<b>Number Haul Trips</b>	<b>Total Fill (yds.<sup>3</sup>)</b>
501-00-1	5.5	% Dirt for Alternative	27	8	6	20,832
349-00-1	0.9	% Dirt for Alternative	5	14	5	3,513
3-00-1	1.7	% Dirt for Alternative	8	12	5	6,467
3-00-6	1.1	% Dirt for Alternative	5	10	6	4,204
349-1	1.7	% Dirt for Alternative	9	9	6	6,532
508-1	4.4	% Dirt for Alternative	22	7	7	16,665
509-1	5.5	% Dirt for Alternative	27	6	7	20,832
3-2	9.0	% Dirt for Alternative	45	13	5	34,461
3-3	0.1	% Dirt for Alternative	0	9	6	371
501-1A	2.6	% Dirt for Alternative	13	6	7	10,001
2098-10	2.8	% Dirt for Alternative	14	12	5	10,771
2098-10A	0.1	% Dirt for Alternative	1	12	5	494
2068-1	2.8	% Dirt for Alternative	14	19	4	10,771
2068-2	11.3	% Dirt for Alternative	56	19	4	43,075
49.4	10.5	% Dirt for Alternative	52	10	6	39,977
47.2	10.5	% Dirt for Alternative	52	10	6	39,977
44.9	7.0	% Dirt for Alternative	35	10	6	26,651
23.3	10.5	% Dirt for Alternative	52	12	5	39,977
22.1	12.2	% Dirt for Alternative	61	12	5	46,640

It was also assumed that construction would occur in phases along the bypass areas for a 4-year duration, with construction starting at one end, and working down/upstream to the opposite end to the final modification area. Total days of construction for each modification area was determined by determining the percent of total dirt each modification area needed, and multiplying this amount by 500 days (125 days of construction per year for 4 years). For number of haul trips per day, it was estimated that the average traveling speed of the haul truck would be 35 mph and it would take approximately 1 hour to load and unload. The number of haul trucks needed at each modification area was estimated by dividing the number of cubic yards needed at each modification area by 20 cubic yards (average haul capacity of a haul truck), dividing this amount by the estimated number of days construction for each modification area, and then

dividing this amount by the number of estimated trips in a 10-hour workday. Emission factors for a haul truck were then multiplied by the number of trucks to estimate haul truck emissions. It was assumed that mitigation would reduce emissions by approximately 20%.

#### **1C.5.2 Fugitive Dust**

Same as under Alternative 2.

#### **1C.5.3 Employee Commute Trips**

Same as under Alternative 2.

#### **1C.5.4 Off-Road Construction Equipment**

Same as under Alternative 2.

### **1C.6 Alternative 6: Stepped Release to 160,000 cfs and New Outlet at Folsom Dam**

Alternative 6 was broken into two components, construction along the Lower American River and construction along the Yolo and Sacramento Bypass areas.

#### **1C.6.1 Fill Dirt: Haul Truck Emissions**

Same as under Alternative 5.

#### **1C.6.2 Fugitive Dust**

Same as under Alternative 2.

#### **1C.6.3 Employee Commute Trips**

Same as under Alternative 2.

#### **1C.6.4 Off-Road Construction Equipment**

Same as under Alternative 2.

### **1C.7 Alternative 7: Stepped Release to 180,000 cfs**

Alternative 7 was broken into two components, construction along the Lower American River and construction along the Yolo and Sacramento Bypass areas.

#### **1C.7.1 Fill Dirt: Haul Truck Emissions**

The amount of fill dirt was estimated by multiplying the length of the proposed modifications by the anticipated width of affected areas by the height of the proposed

modifications. Once specific fill amounts are provided, emission estimates may be calculated with greater accuracy.

It was determined that fill for the Lower American River would come from the West Sacramento borrow site. Additionally, it was determined that there would be 45.5 acres of area disturbed in the Lower American River area and 255.4 acres of area disturbed in the bypass areas for this project alternative. This was calculated by multiplying length of the proposed modifications by width of affected areas. For construction along the Lower American River, it was assumed that there would be four major modification areas, with each modification area grouped according to geography. It was also assumed that each modification area would use differing amounts of fill:

Mod 1	11.6	% Dirt for Alternative
Mod 2	9.9	% Dirt for Alternative
Mod 3	39.5	% Dirt for Alternative
Mod 4	39.0	% Dirt for Alternative

It was also assumed that construction would occur in phases along the Lower American River for a 4-year duration, with construction starting at one end, and working down/upstream to the opposite end to the final modification area. Total days of construction for each modification area was determined by determining the percent of total dirt each modification area needed, and multiplying this amount by 500 days (125 days of construction per year for 4 years). It was estimated that the average haul trip length from the West Sacramento borrow site to a modification area 1 would be approximately 22 miles, to modification area 2 would be approximately 18 miles, and to modification areas 3 and 4 would be approximately 13 miles. With an estimate of a haul truck average traveling speed of 35 mph and approximately 1 hour to load and unload, it was estimated that there would be approximately four total haul trips per day in a 10-hour construction day for modification areas 1 and 2 and five total haul trips per day for modification areas 3 and 4. The number of haul trucks needed at each modification area was estimated by dividing the number of cubic yards needed at each modification area by 20 cubic yards (average haul capacity of a haul truck), dividing this amount by the estimated number of days construction for each modification area, and then dividing this amount by the number of estimated trips in a 10-hour workday. The total number of haul trucks was found to be 22 trucks for modification areas 1 and 2 and 18 trucks for modification areas 3 and 4. Emission factors for a haul truck were then multiplied by the number of trucks to estimate haul truck emissions. It was assumed that mitigation would reduce emissions by approximately 20%.

It was determined that fill for the bypass areas would come from the Cache Creek, West Sacramento, Rio Vista, and Decker Island borrow sites. For construction along the bypass areas, it was assumed that there would be 19 major modification areas, based on data from the Corps. It was also assumed that each modification area would use differing percentages of fill from the borrow sites:

<b>Borrow Sites for Bypass areas</b>	<b>501-00-1</b>	<b>349-00-1</b>	<b>3-00-1</b>	<b>3-00-6</b>	<b>349-1</b>	<b>508-1</b>	<b>509-1</b>	<b>3-2</b>	<b>3-3</b>	<b>501-1A</b>	<b>2098-10</b>	<b>2098- 10A</b>	<b>2068-1</b>	<b>2068-2</b>	<b>49.4</b>	<b>47.2</b>	<b>44.9</b>	<b>23.2</b>	<b>22.1</b>
Cache Creek	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.00	40.00	30.00	0.00	0.00
West Sac.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.00	60.00	70.00	0.00	0.00
Rio Vista	70.00	70.00	70.00	70.00	70.00	70.00	75.00	70.00	70.00	75.00	70.00	70.00	70.00	70.00	0.00	0.00	0.00	70.00	70.00
Decker Island	30.00	30.00	30.00	30.00	30.00	30.00	25.00	30.00	30.00	25.00	30.00	30.00	30.00	30.00	0.00	0.00	0.00	30.00	30.00

Percentages above for fill going to each modification area was estimated based on each modification area's distance from the closest borrow sites.

The amount of fill required for each modification area was from data provided by the Corps:

			<b>Days of Construction</b>	<b>Average Haul Distance (miles)</b>	<b>Number Haul Trips</b>	<b>Total Fill (yds.<sup>3</sup>)</b>
501-00-1	5.5	% Dirt for Alternative	27	8	6	20,832
349-00-1	0.9	% Dirt for Alternative	5	14	5	3,513
3-00-1	1.7	% Dirt for Alternative	8	12	5	6,467
3-00-6	1.1	% Dirt for Alternative	5	10	6	4,204
349-1	1.7	% Dirt for Alternative	9	9	6	6,532
508-1	4.4	% Dirt for Alternative	22	7	7	16,665
509-1	5.5	% Dirt for Alternative	27	6	7	20,832
3-2	9.0	% Dirt for Alternative	45	13	5	34,461
3-3	0.1	% Dirt for Alternative	0	9	6	371
501-1A	2.6	% Dirt for Alternative	13	6	7	10,001
2098-10	2.8	% Dirt for Alternative	14	12	5	10,771
2098-10A	0.1	% Dirt for Alternative	1	12	5	494
2068-1	2.8	% Dirt for Alternative	14	19	4	10,771
2068-2	11.3	% Dirt for Alternative	56	19	4	43,075
49.4	10.5	% Dirt for Alternative	52	10	6	39,977
47.2	10.5	% Dirt for Alternative	52	10	6	39,977
44.9	7.0	% Dirt for Alternative	35	10	6	26,651
23.3	10.5	% Dirt for Alternative	52	12	5	39,977
22.1	12.2	% Dirt for Alternative	61	12	5	46,640

It was also assumed that construction would occur in phases along the bypass areas for a 4-year duration, with construction starting at one end, and working down/upstream to the opposite end to the final modification area. Total days of construction for each modification area was determined by determining the percent of total dirt each modification area needed, and multiplying this amount by 500 days (125 days of construction per year for 4 years). For number of haul trips per day, it was estimated that the average traveling speed of the haul truck would be 35 mph and it would take approximately 1 hour to load and unload. The number of haul trucks needed at each modification area was estimated by dividing the number of cubic yards needed at each modification area by 20 cubic yards (average haul capacity of a haul truck), dividing this amount by the estimated number of days construction for each modification area, and then

dividing this amount by the number of estimated trips in a 10-hour workday. Emission factors for a haul truck were then multiplied by the number of trucks to estimate haul truck emissions. It was assumed that mitigation would reduce emissions by approximately 20%.

#### **1C.7.2 Fugitive Dust**

Same as under Alternative 2.

#### **1C.7.3 Employee Commute Trips**

Same as under Alternative 2.

#### **1C.7.4 Off-Road Construction Equipment**

Same as under Alternative 2.

#### **1C.8 Alternative 8: Stepped Release to 160,000 cfs and Seven-Foot Dam Raise/482 Flood Pool Elevation**

This project alternative is a combination of Alternatives 3 and 5. Refer to them above for assumptions and methodologies.

#### **1C.9 Reference**

U.S. Environmental Protection Agency. 2000. Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data. (EPA420-R-00-002).